

# Automatic Control Electronic Throttle Control System (ETCS) By Google Maps Platform Using Roads API

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**Abstract** – Control Electronic Throttle Control System (ETCS) is an automobile technology which electronically "connects" the accelerator pedal to the throttle, replacing a mechanical linkage

Google Maps Platform Provided the Roads API allows you to map GPS coordinates to the geometry of the road, and to determine the speed limit along those road segments.

The Roads API identifies the roads a vehicle was traveling along and provides additional metadata about those roads, such as speed limits.

This project is to control the speed of any vehicle in highways, roads, cities restricted areas such as schools, parks, hospitals and speed limited areas etc. Using roads API given by Google Maps Platform Provided.

Using the Roads API set the speed limit of every road and send the real time Road Speed Limits information to Engine Control Unit (ECU).

ECU compare the Roads API speed limits and accelerator pedal module current real time speed by driver send signal to Control Electronic Throttle Control System (ETCS).

When the vehicle speed (accelerator pedal module) has more and over then the Roads API speeds The Control Electronic Throttle Control System (ETCS). Activate automatically and do not allow to vehicle speed more than Roads API speed limits.

Finally, the vehicle driving within given Road API speed disallow the vehicle over speed automatically and sent speed limit notification to the driver.

**Key Words:** Electronic Throttle Control System, Google Map, Roads API, GPS, Engine Control Unit, Vehicle's Control Speed Limit Automatically.

## 1. INTRODUCTION

The Purpose of this projects save human life. Because the vehicle accident we lost humans' life we want save the human life. Around 3.75 lakh accidental deaths in India in 2020, over 35 pc in road crashes: NCRB data.

We are in 2022 why we have not protected Humans life and design the system to reduce the vehicle accident.

This system to control vehicle speed automatically and disallow to vehicle over speed by compare given roads API speed limit .

When the driver to try to increase vehicle speed ECU is not permitted to allow over speed and do not send the signal to Control Electronic Throttle Control System (ETCS). And give notification to the drive the road speed limit is 60km/h only.

Driver do not have any option to increase vehicle speed because it's working automatically by used Control Electronic Throttle Control System (ETCS) and Google Maps Platform Provided the Roads API.

Benefits of the system, we reduce the number of accidents by happening over speeds of the vehicle. And save more human life.

This projects technology are available in the world it's already running. Used Control Electronic Throttle Control System (ETCS) used every vehicle since 2008 and Google Maps Platform Provided the Roads API.

We are used both technology and create a system for reduce the number of accidents.

## 2. METHODOLOGY

We are accustomed to the already existing technology Control Electronic Throttle Control System (ETCS) and the Google Maps platform provided by the Roads API.

### 2.1 Control Electronic Throttle Control System (ETCS)

In traditional vehicle designs, stepping on the accelerator pedal runs a cable that is mechanically connected to a butterfly valve in the engine's throttle. The position of this valve directly controls the amount of air supplied to the cylinders and consequently determines engine speed and torque. Most vehicles on the road today have electronic throttle control (ETC). In these vehicles, stepping on the

accelerator pedal sends an electrical signal to the Engine Control Module (ECMS). The ECM uses this information to send a control signal to an electric motor mounted on the throttle body which adjusts the position of the butterfly valve accordingly. A throttle position sensor is used to form a closed-loop control system to ensure that the throttle is open in the correct position.

A major advantage of the electronic throttle is that it can be easily linked to other systems such as engine control, traction control, electronic stability control and cruise control. These other systems are able to control the throttle when necessary to help improve vehicle safety, convenience and fuel savings. For example, the National Highway Traffic Safety Administration has proposed a rule requiring all cars to have a brake-throttle override (BTO) system by September 2014. The BTO system would prioritize brake input when the brake pedal and the accelerator pedal were engaged at the same time.

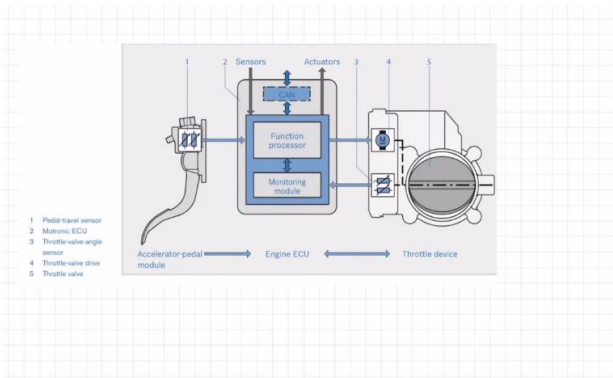


Figure 2:1 Control Electronic Throttle Control System

Sensors: accelerator Pedal position sensors, throttle valve position sensors.

Actuators: Motor on throttle.

Data Communications: CAN bus connection between the ECMS and other systems capable of controlling the throttle.

### 2.2 Google Maps Platform Provided the Roads API

The Roads API identifies the roads the vehicle was traveling on and provides additional metadata about those roads, such as speed limits.

The Roads API allows you to map GPS coordinates to the geometry of the road and set speed limits along those road segments. The API is available through a simple HTTPS interface, and exposes the services:

Speed Limit: This service returns the posted speed limit for a road segment. Speed Limit service is available to all customer by google. For customers of the Google Maps

Platform Premium plan who made the transition to pay-as-you-go pricing, this feature remains active.

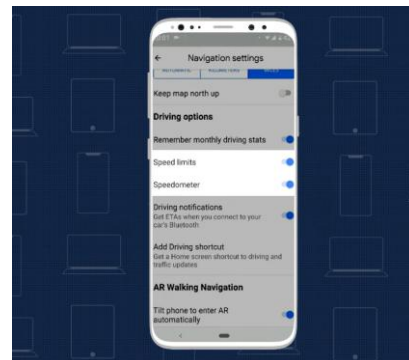


Figure 2:2 Google Provide Speed Limit and speedometer

The Snap to Road API converts GPS point data into a list of objects that form a route for moving roads on a map. With information like full street names and their associated speed limit maps, this API helps you stay more contextually aware of the environment around you.

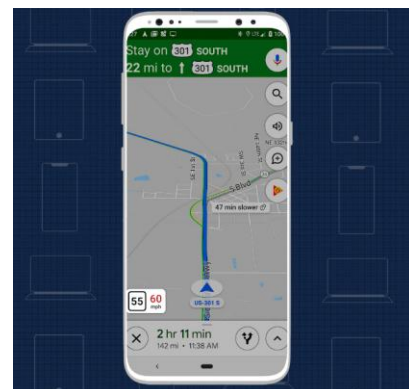


Figure 2:3 Google Provide Speed Limit by road API

### 3. MODELING AND ANALYSIS

The system models given figure 3.1 in the figure is to Engine Control Unit (ECU) Received Two Electronics signals one Driver Speed by Accelerator Pedal Module (30km/h) and second is higher speed limit (60km/h) is given by Google Roads API.

The Engine Control Unit (ECU) process both electronics signals information before send to electronic throttle control.

Compare Driver Speed by Accelerator Pedal Module and second is higher speed limit to each other.

If the driver speed  $\leq$  speed limit vehicle moving at speed of driver (30km/h).

If the driver speed  $\geq$  speed limit Engine Control Unit (ECU) do not allow increase vehicle speed and the vehicle moving at

high speed given by Roads API (60km/h) . The system is also send notification in front of driver display. This Road Speed limit is 60km/h you are not allow to over speed in this Road.

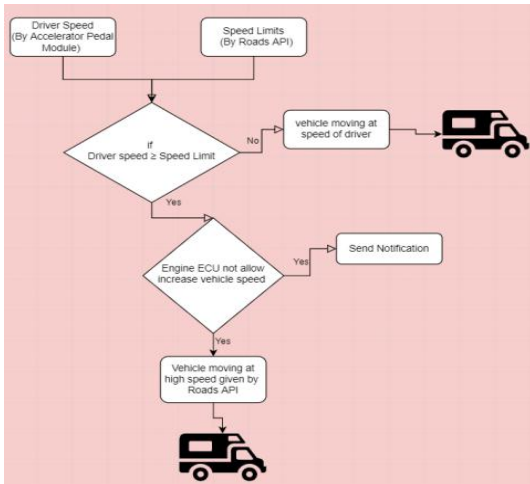


Figure 3:1 System Working Block Diagram

If the driver speed  $\geq$  speed limit Engine Control Unit (ECU) Do Not allow increase vehicle speed and the vehicle moving at high speed given by Roads API (60km/h) .

The system is also send notification in front of driver display. This Road Speed limit is 60km/h you are not allow to over speed in this Road.

#### 4. RESULTS AND DISCUSSION

Google Maps Platform Provided the Roads API National Highway Roads set vehicle speed limit by Road API = 60km/h. By driver Accelerator Pedal Module vehicle speed = 30km/h.

We have two parameter and want to compare both parameter to each other .we design and developed very basic program for get the result below:

```

from asyncio import write

def vehicle_speed_control():

    driver_speed = input("Enter Driver Speed by Accelerator Pedal : ")

    int_driver_speed = int(driver_speed)

    # road_api = input("This Road Higher speed limit by Road API: ")

    road_api = 60

    int_road_api = int(road_api)

    if int_driver_speed >= int_road_api:

```

```

print(f"The vehicles is not allow to over speed in the road the Road Speed Limit is: {road_api}")

```

else:

```

print(f"The vehicles moving with driver Speed is: {driver_speed} and Speed Limit is: {road_api}")

```

for loop in range(0,300) :

vehicle\_speed\_control()

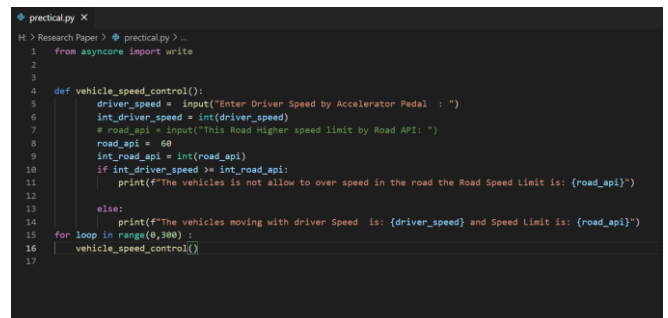


Figure 4:1 System Working Program Codes.

Whenever driver speed 10 km/h ECU send the information to Electronic throttle control And Electronic throttle control adjust the air of the engine and manage vehicle speed by driver.

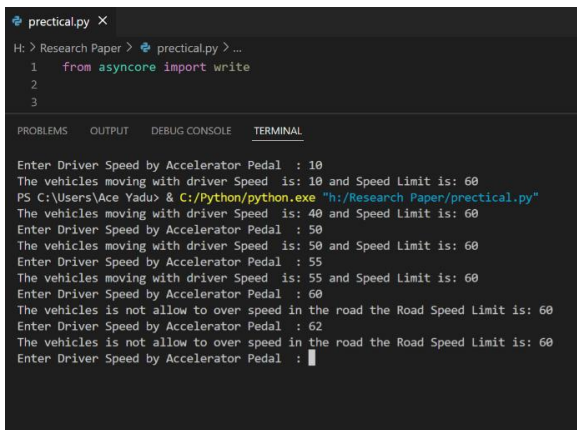
Whenever driver speed 40 km/h ECU send the information to Electronic throttle control And Electronic throttle control adjust the air of the engine and manage vehicle speed by driver.

Whenever driver speed 50 km/h ECU send the information to Electronic throttle control And Electronic throttle control adjust the air of the engine and manage vehicle speed by driver.

Whenever driver speed 55 km/h ECU send the information to Electronic throttle control And Electronic throttle control adjust the air of the engine and manage vehicle speed by driver. Whenever driver speed 60 km/h and 62km/h, ECU do not send the information to Electronic throttle control And electronic throttle control have not new signal and information and manage vehicle speed by manage by google road API

Finally vehicle moving at high speed of road API BY Google Road API. The max speed of vehicles 60km/h in national highways

Results shows below:



```
practical.py X
H: > Research Paper > practical.py > ...
1 from asynscore import write
2
3

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Enter Driver Speed by Accelerator Pedal : 10
The vehicles moving with driver Speed is: 10 and Speed Limit is: 60
PS C:\Users\Ace Yadu> C:/Python/python.exe "h:/Research Paper/practical.py"
The vehicles moving with driver Speed is: 40 and Speed Limit is: 60
Enter Driver Speed by Accelerator Pedal : 50
The vehicles moving with driver Speed is: 50 and Speed Limit is: 60
Enter Driver Speed by Accelerator Pedal : 55
The vehicles moving with driver Speed is: 55 and Speed Limit is: 60
Enter Driver Speed by Accelerator Pedal : 60
The vehicles is not allow to over speed in the road the Road Speed Limit is: 60
Enter Driver Speed by Accelerator Pedal : 62
The vehicles is not allow to over speed in the road the Road Speed Limit is: 60
Enter Driver Speed by Accelerator Pedal : |
```



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**Figure 4:2** System Program Results

## 5. CONCLUSIONS

The focus of this thesis is to the driver is not allow over speed of vehicles in restricted areas such as hospitals, schools and other highways and roads.

This represents the vehicles for the communication model of the infrastructure, when vehicles arrive in a restricted area the system will remove control from the driver and try to optimize the vehicle's speed according to the permitted speed automatically.

The speed, the vehicle speed can be maintained in limited speed without the intervention of the driver. This project is very effective and useful for police traffic because it can control the rash driving behavior in addition to controlling the speed in limited areas, which can save the lives of the people of our country.

## REFERENCES

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